Artificial Metal-Nucleobase Squares and their Interactions with Oligonucleotides, DNA and Simple Anions

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The existence of nucleobase quartets in multistranded nucleic acid structures is well established today and the potential relevance of base tetrads in biology and medicine is increasingly recognized.[1] Only in few cases such as in guanine quartets (G_4) is the role of metal ions in stabilizing these quartets well understood. There, alkali metal ions are either in the center of quartets or sandwiched between G_4 planes.[2]

Our interest in nucleobase quartets has focused on the following aspects: (i) Existence of mixed adenine, guanine quartets and possible isoforms, (ii) effects of physiologically relevant metal ions located at the periphery of the quartet, (iii) artificial nucleobase quartets with non-physiological metal entities ("two-metal, four-purine" motif[3]), (iv) role of artificial metal-purine quartets as anion hosts, and (v) non-covalent interactions of artificial nucleobase quartets with G_4 sequences in tetrastranded DNA.

The results presented are derived from preparative work, X-ray crystallography, NMR spectroscopy, and DFT calculations.

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[1] H. Arthanari, P. H. Bolton, *Chem. Biol.* **2001**, *8*, 221 - 230, and refs. cited. [2] J. T. Davis, *Angew. Chem., Int. Ed.* **2004**, *43*, 668 - 698, and refs. cited. [3] M. Roitzsch, B. Lippert, *Inorg. Chem.* **2004**, *43*, 5483 - 5485.